

The number of subspecies of birds

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We now have a rather accurate estimate of the number of species of birds (9700). What uncertainty still exists is caused less by species still to be discovered than by differences of opinion on the status of geographically rather isolated forms; it is sometimes quite arbitrary whether to call them subspecies or allospecies. The recent raising in rank of many such forms, considered subspecies 20 or 30 years ago, to the rank of allospecies is the major reason for the rise of the number of species of birds from the earlier censuses of about 8600 to the latest count of 9672 in Sibley & Monroe (1990).

By contrast, no one in recent years has ventured to make a census or even merely a guess as to the number of avian subspecies. This is why Ernst Mayr, assisted by Jane Gerloff, decided to undertake such a census. This census is simply based on the figures contained in the 15 volumes of Peters' *Check-list of Birds of the World* (1934–1986). All such a census can achieve is to get the approximate order of magnitude of this figure.

There are five sources of inaccuracy for these figures.

1. Subspecies belonging to families treated in volumes 2–15 of the Peters' *Check-list* but described after the publication (1934, etc.) of the relevant volume are not included. For volume 1 the date of 1979, when the revised edition was published, is the cut-off date.

2 Invalid subspecies. No attempt was made to check the validity of any of the listed subspecies. There is little doubt that many forms described at the height of the subspecies-splitting period from the 1920s to the 1950s have been or will be synonymized in subsequent revisions.

3 Many particularly pronounced and highly isolated forms that were listed as subspecies in the volumes of Peters' *Check-list*, are now ranked as allospecies. Others surely will also be raised in rank resulting in a reduction of the number of subspecies and a corresponding increase in the number of allospecies (without affecting the total number of described forms). This great increase in the number of allospecies is the cause for the much larger number of species recorded by Sibley & Monroe than in Peters' *Check-list*.

4 Family revisions, undertaken since the completion of Peters' *Check-list* particularly by Sibley, have resulted in the shift of certain genera to other families. Since many of these shifts are controversial, none were here followed. They are of no relevance to the overall figures.

5. Counting errors.

Classification Family	A	B Species		C	D	E	F	Ratios	
	Gen	MT	PT	PT	Total	Ssp PT	Total B+E	G Ssp/sp E/D	H Ssp/PT E/C
1 Struthionidae	1	0	1		1	5	5	5.00	5.00
2 Rheidae	2	0	2		2	8	8	4.00	4.00
3 Casuariidae	1	3	0		3	0	3	1.00	0.00
4 Dromaiidae	1	1	1		2	2	3	1.50	2.00
5 Apterygidae	1	2	1		3	3	5	1.67	3.00
6 Tinamidae	9	21	25		46	128	149	3.24	5.12
7 Diomedidae	2	8	5		13	11	19	1.46	2.20
8 Procellariidae	12	39	21		60	67	106	1.77	3.19
9 Hydrobatidae	8	13	8		21	24	37	1.76	3.00
10 Pelecanoididae	1	3	1		4	6	9	2.25	6.00
11 Spheniscidae	6	11	5		16	15	26	1.63	3.00
12 Gaviidae	1	3	1		4	3	6	1.50	3.00
13 Podicipedidae	6	9	11		20	41	50	2.50	3.73
14 Phaethontidae	1	0	3		3	12	12	4.00	4.00
15 Frigateidae	1	3	2		5	8	11	2.20	4.00
16 Phalacrocoracidae	2	16	15		31	45	61	1.97	3.00
17 Sulidae	1	5	4		9	13	18	2.00	3.25
18 Pelecanidae	1	4	2		6	8	12	2.00	4.00
19 Ardeidae	15	37	25		62	103	140	2.26	4.12
20 Scopidae	1	0	1		1	2	2	2.00	2.00
21 Ciconiidae	6	13	4		17	10	23	1.35	2.50
22 Balaenicipitidae	1	1	0		1	0	1	1.00	0.00
23 Threskiornithidae	13	19	9		28	30	49	1.75	3.33
24 Phoenicopteridae	3	4	1		5	2	6	1.20	2.00
25 Cathartidae	5	5	2		7	8	13	1.86	4.00
26 Accipitridae	60	116	102		218	434	550	2.52	4.25
27 Sagittariidae	1	1	0		1	0	1	1.00	0.00
28 Falconidae	10	32	28		60	132	164	2.73	4.71
29 Anatidae	43	106	44		150	140	246	1.64	3.18
30 Anhimidae	2	3	0		3	0	3	1.00	0.00
31 Megapodiidae	7	9	9		18	31	40	2.22	3.44
32 Cracidae	11	26	19		45	64	90	2.00	3.37
33 Tetraonidae	11	5	14		19	97	102	5.37	6.93
34 Phasianidae	57	88	97		185	468	556	3.01	4.82
35 Numididae	5	4	3		7	31	35	5.00	10.33
36 Meleagrididae	2	1	1		2	5	6	3.00	5.00
37 Opisthocomidae	1	1	0		1	0	1	1.00	0.00
38 Mesoenatidae	2	3	0		3	0	3	1.00	0.00
39 Turnicidae	2	6	8		14	45	51	3.64	5.63
40 Pedionomidae	1	1	0		1	0	1	1.00	0.00
41 Gruidae	4	9	5		14	14	23	1.64	2.80
42 Aramidae	1	0	1		1	5	5	5.00	5.00
43 Psophiidae	1	0	3		3	6	6	2.00	2.00
44 Rallidae	52	82	56		138	251	333	2.41	4.48
45 Heliornithidae	3	2	1		3	4	6	2.00	4.00
46 Rhynochetidae	1	1	0		1	0	1	1.00	0.00
47 Eurypygidae	1	0	1		1	3	3	3.00	3.00
48 Cariamidae	2	2	0		2	0	2	1.00	0.00
49 Otidae	11	11	13		24	37	48	2.00	2.85
50 Jacanidae	6	5	2		7	12	17	2.43	6.00
51 Rostratulidae	2	1	1		2	2	3	1.50	2.00
52 Haematopodidae	1	2	2		4	19	21	5.25	9.50
53 Charadriidae	33	42	19		61	60	102	1.67	3.16
54 Scolopacidae	29	61	22		83	59	120	1.45	2.68
55 Recurvirostridae	4	6	1		7	6	12	1.71	6.00
56 Phalaropodidae	3	3	0		3	0	3	1.00	0.00
57 Dromadidae	1	1	0		1	0	1	1.00	0.00
58 Burhinidae	3	3	6		9	23	26	2.89	3.83
59 Glareolidae	6	7	10		17	37	44	2.59	3.70
60 Thinocoridae	2	0	4		4	12	12	3.00	3.00

Classification Family	A Gen	B Species		D Total	E Ssp PT	F Total B+E	Ratios	
		MT	PT				G Ssp/sp E/D	H Ssp/PT E/C
61 Chionididae	1	1	1	2	4	5	2.50	4.00
62 Stercorariidae	2	3	1	4	7	10	2.50	7.00
63 Laridae	17	54	31	85	131	185	2.18	4.23
64 Rynchopidae	1	2	1	3	4	6	2.00	4.00
65 Alcidae	13	16	7	23	21	37	1.61	3.00
66 Pteroclididae	2	4	12	16	41	45	2.81	3.42
67 Raphidae-[extinct]	1	2	0	2	0	2	1.00	0.00
68 Columbidae	59	136	171	307	705	841	2.74	4.12
69 Psittacidae	81	164	171	335	614	778	2.32	3.59
70 Musophagidae	6	6	14	20	37	43	2.15	2.64
71 Cuculidae	38	61	68	129	296	357	2.77	4.35
72 Tytonidae	2	4	6	10	56	60	6.00	9.33
73 Strigidae	27	52	81	133	482	534	4.02	5.95
74 Steatornithidae	1	1	0	1	0	1	1.00	0.00
75 Podargidae	2	6	6	12	23	29	2.42	3.83
76 Nyctibiidae	1	2	3	5	12	14	2.80	4.00
77 Aegothelidae	1	2	5	7	15	17	2.43	3.00
78 Caprimulgidae	19	22	47	69	182	204	2.96	3.87
79 Apodidae	16	34	40	74	185	219	2.96	4.63
80 Hemiprocnidae	1	0	3	3	15	15	5.00	5.00
81 Trochilidae	123	179	152	331	509	688	2.08	3.35
82 Coliidae	1	2	4	6	27	29	4.83	6.75
83 Trogonidae	8	8	26	34	95	103	3.03	3.65
84 Alcedinidae	14	22	67	89	315	337	3.79	4.70
85 Todidae	1	5	0	5	0	5	1.00	0.00
86 Momotidae	6	2	6	8	43	45	5.63	7.17
87 Meropidae	7	12	12	24	38	50	2.08	3.17
88 Leptosomatidae	1	0	1	1	3	3	3.00	3.00
89 Coraciidae	5	9	7	16	28	37	2.31	4.00
90 Upupidae	1	0	1	1	9	9	9.00	9.00
91 Phoeniculidae	2	0	6	6	27	27	4.50	4.50
92 Buccrotidae	12	17	29	46	87	104	2.26	3.00
93 Galbulidae	5	8	8	16	30	38	2.38	3.75
94 Bucconidae	10	13	20	33	63	76	2.30	3.15
95 Capitonidae	13	22	56	78	233	255	3.27	4.16
96 Indicatoridae	4	6	7	13	30	36	2.77	4.29
97 Ramphastidae	5	23	18	41	64	87	2.12	3.56
98 Picidae	38	67	147	214	788	855	4.00	5.36
99 Eurylaimidae	8	3	11	14	56	59	4.21	5.09
100 Dendrocolaptidae	13	9	39	48	251	260	5.42	6.44
101 Furnariidae	58	109	109	218	441	550	2.52	4.05
102 Formicariidae	53	90	134	224	594	684	3.05	4.43
103 Conopophagidae	2	5	6	11	20	25	2.27	3.33
104 Rhinocryptidae	12	13	14	27	50	63	2.33	3.57
105 Tyrannidae	89	173	219	392	936	1109	2.83	4.27
106 Pipridae	17	27	24	51	122	149	2.92	5.08
107 Cotingidae	25	44	17	61	49	93	1.52	2.88
108 Oxyruncidae	1	0	1	1	7	7	7.00	7.00
109 Phytotomidae	1	2	1	3	2	4	1.33	2.00
110 Pittidae	1	10	16	26	90	100	3.85	5.63
111 Philepittidae	2	4	0	4	0	4	1.00	0.00
112 Acanthisittidae	2	2	2	4	5	7	1.75	2.50
113 Menuridae	1	1	1	2	2	3	1.50	2.00
114 Atrichornithidae	1	1	1	2	2	3	1.50	2.00
115 Alaudidae	15	28	48	76	354	382	5.03	7.38
116 Hirundinidae	20	35	44	79	172	207	2.62	3.91
117 Motacillidae	5	25	29	54	159	184	3.41	5.48
118 Campephagidae	9	20	50	70	298	318	4.54	5.96
119 Pycnonotidae	15	43	77	120	353	396	3.30	4.58
120 Irenidae	3	3	11	14	54	57	4.07	4.91

Classification Family	A Gen	B Species		D Total	E Ssp PT	F Total B+E	Ratios	
		MT	PT				G Ssp/sp E/D	H Ssp/PT E/C
121 Laniidae	12	26	48	74	231	257	3.47	4.81
122 Vangidae	8	7	5	12	10	17	1.42	2.00
123 Bombycillidae	5	5	3	8	9	14	1.75	3.00
124 Dulidae	1	1	0	1	0	1	1.00	0.00
125 Cinclidae	1	0	4	4	23	23	5.75	5.75
126 Troglodytidae	14	12	47	59	345	357	6.05	7.34
127 Mimidae	13	12	19	31	73	85	2.74	3.84
128 Prunellidae	1	4	8	12	30	34	2.83	3.75
129 Turdidae	49	119	188	307	880	999	3.25	4.68
130 Timaliidae	65	94	203	297	960	1002	3.37	4.73
131 Sylviidae	60	124	234	358	1105	1229	3.43	4.72
132 Muscicapidae	9	41	66	107	271	312	2.92	4.11
133 Platysteiridae	4	15	15	30	44	59	1.97	2.93
134 Maluridae	4	9	16	25	56	65	2.60	3.50
135 Acanthizidae	17	30	42	72	177	207	2.88	4.21
136 Monarchidae	20	50	78	128	403	453	3.54	5.17
137 Eopsaltriidae	11	13	26	39	107	120	3.08	4.12
138 Pachycephalidae	10	11	35	46	259	270	5.87	7.40
139 Aegithalidae	3	3	5	8	40	43	5.38	8.00
140 Remizidae	4	4	6	10	24	28	2.80	4.00
141 Paridae	4	12	35	47	218	230	4.89	6.23
142 Sittidae	4	7	18	25	88	95	3.80	4.89
143 Certhiidae	2	2	4	6	36	38	6.33	9.00
144 Rhabdornithidae	1	0	2	2	2	8	4.00	1.00
145 Climacteridae	1	2	4	6	13	15	2.50	3.25
146 Dicaeidae	7	18	40	58	167	185	3.19	4.18
147 Nectariniidae	5	41	75	116	352	393	3.39	4.69
148 Zosteropidae	11	44	38	82	197	241	2.94	5.18
149 Meliphagidae	39	77	95	172	380	457	2.66	4.00
150 Emberizidae	133	236	316	552	1496	1732	3.14	4.73
151 Parulidae	27	64	59	123	309	373	3.03	5.24
152 Drepanididae	12	14	7	21	25	39	1.86	3.57
153 Vireonidae	4	18	25	43	148	166	3.86	5.92
154 Icteridae	25	42	49	91	214	256	2.81	4.37
155 Fringillidae	20	48	74	122	357	405	3.32	4.82
156 Estrildidae	28	51	75	126	291	342	2.71	3.88
157 Ploceidae	19	67	76	143	291	358	2.50	3.83
158 Sturnidae	26	60	51	111	176	236	2.13	3.45
159 Oriolidae	2	10	18	28	73	83	2.96	4.06
160 Dicuridae	2	8	12	20	90	98	4.90	7.50
161 Callaeidae	3	1	2	3	4	5	1.67	2.00
162 Grallinidae	3	4	0	4	0	4	1.00	0.00
163 Artamidae	1	6	4	10	19	25	2.50	4.75
164 Cracticidae	3	2	8	10	34	36	3.60	4.25
165 Ptilonorhynchidae	8	7	10	17	33	40	2.35	3.30
166 Paradisaeidae	20	13	27	40	98	111	2.78	3.63
167 Corvidae	26	55	48	103	298	353	3.43	6.21
Totals	2129	3963	4931	8894	22,243	26,206	2.50	4.51

Contents of the Columns

A=Genera

B=Monotypic Species

C=Polypotypic Species

D=Total number of Species in the family (B+C)

E=Number of subspecies in the polypotypic species (nominata subspecies included)

F=Total number of forms (B+E)

G=Average number of Subspecies per Species (E/D)

H=Average number of Subspecies per Polypotypic Species (E/C)

Totals

In the 167 families of birds recognized in Peters' *Check-list*, 8894 species are listed. Of these, 3963 are monotypic (i.e., without subspecies), while 4931 are considered polytypic. The total number of listed subspecies (including the nominate one) in these polytypic species is 22,243; not including the nominate subspecies in this total reduces the number of subspecies to 17,289. The total number of listed named forms, i.e. all subspecies and monotypic species, is 26,206. This grand total is apt to be reasonably stable since it is not affected by the shift of rank of a subspecies to an allospecies. Also, the sinking of subspecies now considered invalid but recognized in Peters' *Check-list* and the subsequent recognition of new subspecies (not included in Peters' *Check-list*) will balance each other to some extent. However, more valid subspecies were presumably published in the nearly sixty years since the publication of vol. 2 (1934), than invalid ones are included that are to be synonymized. The real total of valid named forms is therefore presumably somewhere between 27,000 and 28,000.

We have tried to arrive at some generalizations on subspeciation. Oceanic bird species usually have fewer subspecies than land birds. Non-Passeres on average have fewer subspecies (usually less than three) than Passeres (usually more than three). Families with few species vary naturally the most, ranging from containing only monotypic species, like the Todidae, to having only a single but polytypic species with 9 subspecies (Upupidae). Two factors seem to be primarily responsible for the number of subspecies: the stability of the phenotype and the dispersal-colonization propensity of the group, in other words, a genetic and an ecological factor. One must undertake a species by species analysis if one wants to get beyond these very modest generalizations.

References:

- Peters, J. L. 1934-1986. *Check-list of Birds of the World*. Museum of Comparative Zoology, Cambridge.
Sibley, C. G. & Monroe, B. L. 1990. *Distribution and Taxonomy of Birds of the World*. Yale Univ. Press.

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